infections reaching the testes through the blood stream; and the observance of testicular affection in a case with a history of infections belonging almost exclusively to the group under consideration, and at the same time exhibiting a leukopenia —the suggestion is offered that there is a definite relation between testicular affection on the one hand and a disturbance in the normal relation between the number of granular to the number of hyaline leukocytes, i. e. a tendency toward decrease in the number of granular cells and increase in the number of hyaline ones.

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CLINICAL RECORDS.*

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IV. "THE WARD REFERENCE BOOK."

The duty of hospitals to try out the newer suggestions in diagnostic and therapeutic procedures necessitates their doing many things which are not described in text-books; and it is customary for the workers to keep memoranda of such procedures for handy reference. What often happens, however, is that interns keep notebooks or card systems while they are on service and carry them away or lose them when they leave, so that the routine work of the wards and laboratories is subject to frequent alterations. While changes in technic are often desirable, they should of course be dictated by choice rather than chance, and the

* Fourth article describing the clinical record system in the University of California Hospital. An article by Dr. J. L. Whitney and one by the writer on related subjects appeared in the Boston Medical and Surgical Journal of November 18, 1915. Reprints of the series when complete, together with record forms, etc., will be sent on request.

hospital organization should aim to eliminate to the greatest possible extent the jars incident to changing of staff.

With this in view, a "ward reference book" has been used in the University Hospital during the last three years. Reference has already been made to it several times as containing instructions to interns and nurses in regard to the form of histories, methods of charting, permissible abbreviations, etc., etc. It has an alphabetic index and detachable leaves to facilitate changes; and it is the authorized guide for interns and for students who may be working in the wards.

A copy of the book and of the changes made in it from time to time is incorporated in the bound volumes of the clinical records, so that, as already explained, another important function of this book is to make clear to those in the future who use the records the exact technic of various tests in vogue at any given time. This function of supplementing the permanent clinical records implies a still greater need for continuity of the scheme. *To secure this continuity it is necessary that some person in a permanent salaried position assume the responsibility for it.* The logical one to do this is the custodian of records. When new clinical procedures are introduced, some member of the staff looks up the literature and writes out the reference and a condensed description of the technic and leaves it in the record room where copies are made for the records and for the "ward reference book" (which may thus be kept in duplicate in several convenient places in the hospital). When members of the staff forget to do this the omission is quickly discovered in the filing room by finding unfamiliar tests mentioned in the records, and the responsible persons are asked to supply the needed data.

The following extracts from the ward reference book which, as indicated above, have been supplied by different members of the hospital staff, will serve as illustrations. The list is not complete and is indorsed only as things which were considered worth a trial.

ACIDOSIS.

Alkali Tolerance Test for (Peabody, Arch. of Int. Med., Dec. 1915, p. 958).

Give 2½ gm. sodium bicarbonate by mouth every hour and at the same time collect a specimen of urine. Record grams of soda consumed before the urine (examined fresh) becomes acid to litmus paper. The high normal limit is about 10 gm.

AMEBA STAIN.

(Modified Schaudin.)

1. On slides or cover slips fix for 1 minute at 60° to 70° C. very thin smears from stools with: saturated aqueous mercuric bichlorid sol. 2 parts, absolute alcohol 1 part. Transfer to cold bichlorid alcohol mixture for 10-15 minutes.
2. Place in 60% alcohol for a few minutes.
3. Place in 70% alcohol and a few drops of tincture of iodin for a few minutes.
4. Pass through 70%, 80%, 70%, and 60% alcohol for 3 or 4 minutes each.
5. Place in distilled water for 5 minutes.
6. Stain with much diluted Delafield's hematoxylin 2-4 hours.
7. Rinse in tap water.
8. Differentiate with acid alcohol (0.5-1.% HCl).
9. Rinse and wash in tap water one-half hour.
10. Pass through 60%, 70%, 80%, 90%, 95%, and absolute alcohol for 3 or 4 minutes each.
11. Place in Xylol. Mount in Balsam.

Instead of Delafield's hematoxylin in No. 6, may use iron hematoxylin, applying the mordant for 3 hours and the hematoxylin for 20-24 hours. Differentiate very carefully with diluted mordant. Dehydrate and mount as above.

ANEMIA CASES.

Complete counts once a week as long as hemoglobin is below 60%.

Platelet count on entrance. *Coagulation time* and *bleeding time* on entrance. Blood findings to be plotted on special graphic chart.

In making differential counts particular attention is to be paid to the red cells, and the presence or absence of pathological changes noted. The presence or absence of nucleated reds to be noted. If present, their numbers per cu. mm. to be calculated, and they are to be classified (in percentages) as to normoblasts, megaloblasts and intermediates.

BLOOD EXAMINATION.

(See also anemia and leukemia.)

A complete examination (hemoglobin, red and white cell counts, and a differential count) is to be done as routine on entrance in every case in which the hemoglobin is *more than 110%* or less than *75%*. In other cases, hemoglobin estimation, white count and differential, are sufficient.

Hemoglobin: Dare instrument to be used.

Red Count: Count four units (consisting of 25 small squares each) in each of two preparations, making sure that Newton's rings are present and that the cells are evenly distributed before counting.

In cases where the red count is very low and the white count very high, as in leukemias, do not try to distinguish reds from whites in the counting chamber, but count every cell and make the correction later by subtracting from the result the white cell count. This is ordinarily not necessary unless the white count is over 100,000.

White Count: Count the cells in one square millimeter in each of two preparations, observing the same precautions as above.

In anemia and leukemia cases, when the differential count shows a large number of nucleated reds to be present, the white count must be corrected to allow for them, since in the counting chamber both whites and nucleated-reds were counted as whites. (E. g., if the count totaled 22,000 cells per cu. mm., and the differential count showed 10 blasts to every 100 leukocytes, the true number of leukocytes per cu. mm. would be 20,000 per cu. mm.

Differential Count: Use thin smears on *cover glasses.* Stain with Wright's stain. In ordinary cases count *at least* 200 leukocytes and indicate number counted in the report. Classify as follows: Neutrophiles, Large Mononuclears (including "transitionals"), Lymphocytes, Eosinophiles, and Basophiles (Mastzellen). If myelocytes be present classify them as to neutrophilic or eosinophilic granulation.

In regard to the red cells: always note the average size and whether any of the following pathological changes are present: central pallor, stippling, polychromatophilia, poikilocytosis and anisocytosis. If the red cells appear normal, *state that fact on the record.* If *nucleated reds* are present do *not* tabulate them as percentage of white cells. Mention how many were seen in making the differential count, and if more than one or two, calculate their number per cu. mm.

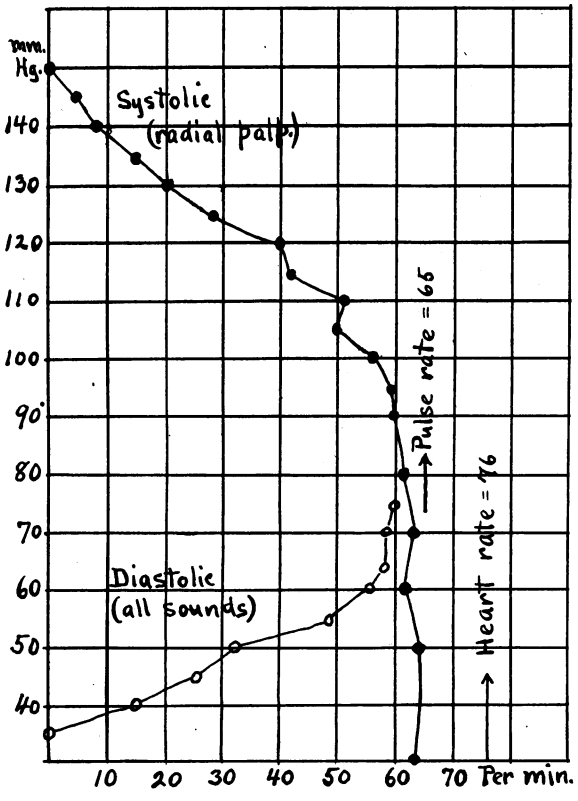

Fig. I. Showing method of recording fractional blood pressure determinations.

This is done by noting the ratio between them and the leukocytes. If the blasts are numerous, the white count must be corrected to allow for them. (See under "white count.") Nucleated reds are to be classified as follows: *normoblasts,* cells the same size as a normal red cell, with a densely staining, sharply outlined (pyknotic) nucleus; *megaloblasts,* cells in which the nucleus is at least the usual size of a red cell, and the cell body itself considerably larger; *intermediates,* cells a trifle larger than normoblasts, with the nucleus staining less densely and either fragmented, lobulated, or undergoing mitosis, and the cell protoplasm usually showing basophilic granulations or polychromatophilia.

Bleeding Time. (Duke, Jr. A. M. A., 1910, lv., 1185.) "A small cut is made in the lobe of the ear. At half-minute intervals the blood is blotted up on absorbent paper. This gives a series of blots of gradually decreasing size. Each blot represents one-half minute's outflow of blood. The rate of decrease in the size of the blots shows the rate of decrease of hemorrhage. The cut should be made of such a size that the first half minute's outflow of blood makes a blot one or two centimeters in diameter. The total duration of such a hemorrhage is called the bleeding time." It is normally one to three minutes.

Coagulation Time. By venous puncture draw 2 c.c. blood into a clean syringe which has been dried, rinsed with albolene, then normal salt solution; and inject it into a clean, dry test-tube about 14 mm. in diameter. The test of coagulation is ability to invert the tube slowly without dislodging the blood. By this technic normal blood in room temperature of 20° C. clots in about 15 minutes. For each degree below this temperature about 1 or 2 minutes will probably be added to the coagulation time. The results, however, should be controlled by a simultaneous determination with normal blood.

Blood Sugar Estimation. (Lewis and Benedict, Jr. Biol. Chem., Jan., 1915.) Discharge exactly 2 c.c. blood obtained by venous aspiration into an Oswald pipette into a 25 c.c. volumetric flask containing 5 c.c. water. Shake thoroughly, then add 15 c.c. saturated aqueous solution of picric acid and 1 or 2 drops of alcohol to dispel the foam. Add water to the 25 c.c. mark, shake, and filter. Measure 8 c.c. aliquots into large test-tubes for duplicate determinations. To the tube being examined add 1 c.c. of a 10% sod. carbonate solution (as well as two glass beads and 2 or 3 drops of mineral oil), and evaporate rapidly over a direct flame until precipitation occurs. Add 3 c.c. water and again boil to dissolve the precipitate and transfer quantitatively to a 10 c.c. volumetric flask. Cool, make up to the mark, shake, and filter through cotton into the colorimeter chamber, and compare at once with the

Permanent Standard Solution.

Picramic acid ..... 0.064 gm.
Sod. carbonate (anhydrous)..... 0.100 gm.
Water to make.....1000. c.c.

Dissolve the picramic acid with the aid of heat. If this standard solution is correct its color will be the same as that of 0.64 mgm. dextrose, 5 c.c. saturated picric acid and 1 c.c. of 10% sod. carbonate when evaporated to precipitation over a free flame and diluted to 10 c.c.

Calculation: Per cent. of dextrose in the blood = 1/10 the reading of standard solution ÷ reading of unknown.

Blood Urea Determination. (Modified from Van Slyke and Cullen, Jr. A. M. A., May 16, 1914, p. 1558.) Five c.c. of fresh blood or spinal fluid, measured with an accurate pipette,

are run into a 100 c.c. test-tube, containing 1 c.c. of 3% potassium citrate (to prevent clotting). One-half c.c. of the urease solution and 2 or 3 drops of capryllic alcohol (to prevent foaming) are added. After ten minutes 5 c.c. of the saturated potassium carbonate solution are added, the ammonia is driven by aeration [1] into 10 c.c. of a fiftieth-normal acid (hydrochloric or sulphuric), and the excess acid is titrated back with hundredth-normal sodium hydroxid. Each cubic centimeter of hundredth-normal acid neutralized indicates 0.01 per cent. (grams per hundred cubic centimeters) of urea in the blood, or .0056 per cent. of urea nitrogen.

In case the blood should be one of the rare samples containing over 0.15 per cent. of urea, all the acid will be neutralized, and it will be necessary to repeat the determination, using a sample of only 1 c.c. Fresh blood contains so little ammonia that it can be disregarded.

Preparation of the Urease Enzyme Solution: Two gm. of the enzyme preparation (extracted from the soja bean—obtainable from Arlington Chemical Co., Yonkers, N. Y.) 0.6 gm. of dipotassium hydrogen phosphate, and 0.4 gm. of potassium dihydrogen phosphate, are stirred up with a rod in 10 c.c. of water. The enzyme preparation dissolves in about a minute, forming an opalescent solution. A few floccules of insoluble matter may remain, but the active enzyme all goes into solution at once. The urease can be obtained from the manufacturers in 1 gm. proportions already mixed with the proper amounts of phosphate, so that it is merely necessary to dissolve the mixture in 10 c.c. of water. The acid phosphate serves a double purpose; it accelerates the enzyme action and renders the enzyme solution more stable. If the latter is covered with toluene it will ordinarily hold its actiivty for a fortnight, but it is safer to use fresh solutions.

BLOOD PRESSURE.

In all cases readings should be recorded on day of entrance, on the following day and not less than once a week thereafter. Patients with systolic pressure over 160 mm. Hg. should have the measurements daily. After proper instruction nurses may be trusted to make these measurements in ordinary cases under the close supervision of the resident staff.

Ordinarily the following technic is to be used: With the patient in the dorsal decubitus (except when orthopnea is present) after at least 10 to 15 minutes' undisturbed rest, the 12 cm. cuff is fitted smoothly around the upper arm. It may be over the thin loose nightgown sleeve, but not over heavier clothing. Use a mercury pressure gage or a dial instrument frequently checked up by comparison with mercury. Determine systolic pressure by radial palpation, reading at the time the first wave is felt during *gradual decompression,* and record the highest of two or three readings made in quick succession. Then rest the arm by releasing the air from the cuff for a few seconds. Reinflate the cuff and with falling pressure read diastolic blood pressure at the "change of sound" index if this is clear; if not, at the instant of sound disappearance. Record the highest of two or three readings, and always indicate in the report which criterion was used.

Do not try to read blood pressure after the cuff has been inflated continuously for longer than 30 or 40 seconds; let out the air and try again.

The technic described above is sufficient only for cases with fairly regular heart action.

The Fractional Method of Blood Pressure Determination (Kilgore, Arch. of Int. Med., Dec. 1915) should be applied by the intern once a week in cases with auricular fibrillation or other gross arrhythmia. Proceed as follows:

Find the cuff pressure at which no beats come through (indicated by radial palpation). Suppose, for example, this to be 150 mm. Hg. After resting the arm a few seconds, reinflate the cuff and maintain the pressure at 145 for exactly one-half minute and count the waves felt. Again rest the arm and count with pressure 140, and so on until as many waves are counted as can be palpated with zero cuff pressure.

For diastolic pressure proceed in the same way, counting with the stethoscope below the cuff all sounds heard in half-minute intervals (or only the loud staccato notes in case the sounds persist with zero cuff pressure).

Express the results graphically as shown in Fig. 1.

[1] Use either compressed air or suction. Let the air be first washed through an acid solution to remove any atmospheric ammonia, then pass through the urease solution, then the hundredth-normal acid solution. In each of the three containers have the inlet tube reach to the bottom.

IS RABIES UNDER CONTROL IN CALIFORNIA?

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The results shown in the following table are based upon records of the laboratory of the Bureau of Communicable Diseases of the California State Board of Health. The table shows the number of examinations, by months, of brains proven positive for rabies by microscopical examination and animal inoculation:

A glance at the table above will serve to indicate the steady decrease in the number of examinations for the year 1915 up to date. Coincident with this decrease, the demand for the Pasteur treatment of persons bitten by rabid animals grew less. At the State Hygienic Laboratory and its branches the Pasteur treatment was administered to one person in July, two in August, one in September, none in October, one in November, and none in December, 1915. With the antirabic virus supplied by the State Hygienic Laboratory to the various city health departments, there was treated in Los Angeles one person in July, two in August, none in September, three in October,